

Instrument and Charts

List of instruments

- Ayre's spatula
- Perforated tissue processing capsule
- Leuckhart's L block& paraffin block
- Plastic tissue cassette/ block mould
- BM Aspiration needle
- Lumbar puncture needle
- Wintrobe's hematocrit tube
- Westergren's pipette
- Vacutainers ,uristix 10 parameters,blood collection bag



- AYRE SPATULA
- Use for taking Pap Smear for screening of carcinoma cervix.
- Made of wood so that cells can adhere to its porous surface.
- The long end is inserted into cervical canal and rotated in 360 degrees. The exfoliated cells obtained are smeared on glass slide and fixed in Koplicks jar which contains ether and alcohol in equal amount. or by hair spray. The other broad end is used for obtaining cells from lateral vagina for knowing the hormonal status. _x0000_



Extended tip spatula

Ayre's spatula

Cytobrush

L-mould (Leuckhart's embedding mould)

Two 'L' shaped pieces of heavy brass metal can be adjusted to make various size moulds.

L-moulds are kept on a glass. Tissue is placed on the bottom & then the space is filled with molten wax.

The wax is cooled & solidified, L-moulds are removed.

The brick like square with embedded tissue is called paraffin block.





Perforated tissue processing capsule

Tissue cassettes us
to hold samples of all sizes for
histopathological processes.



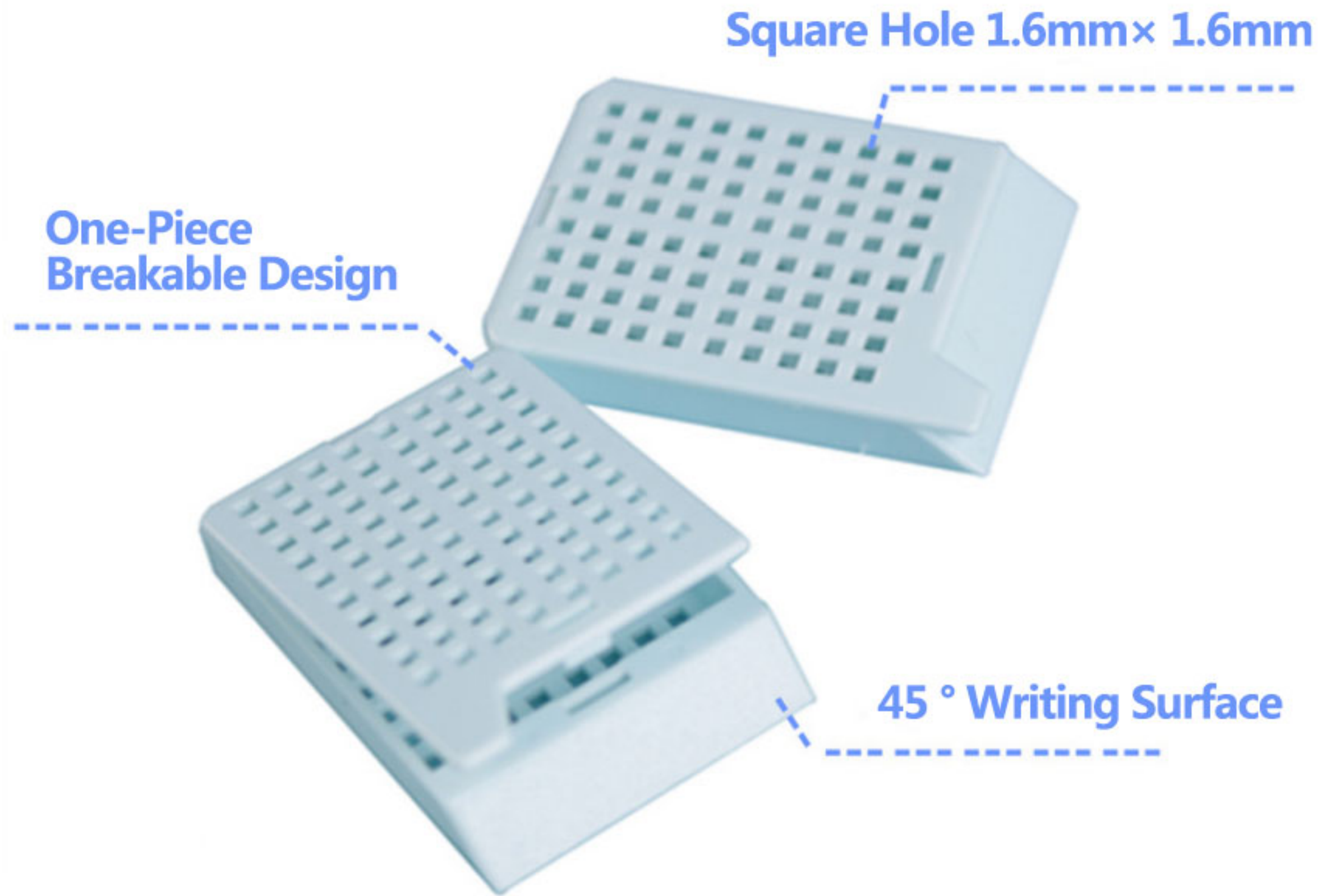
Plastic tissues embedding cassette



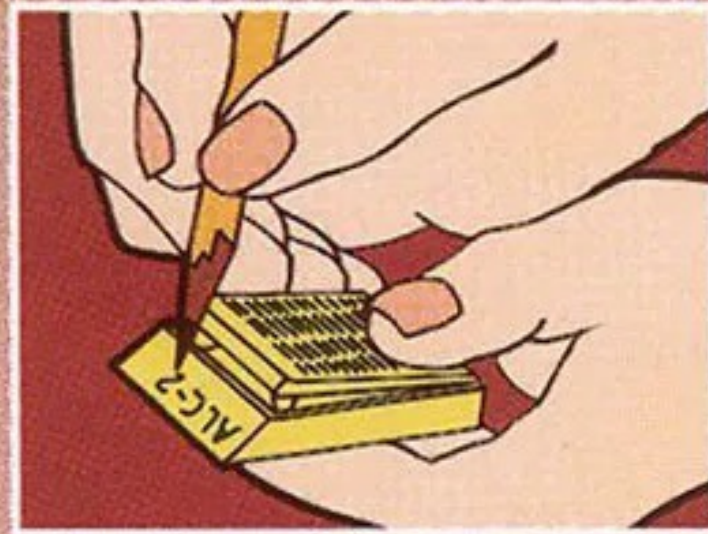
Tissue embedding mould



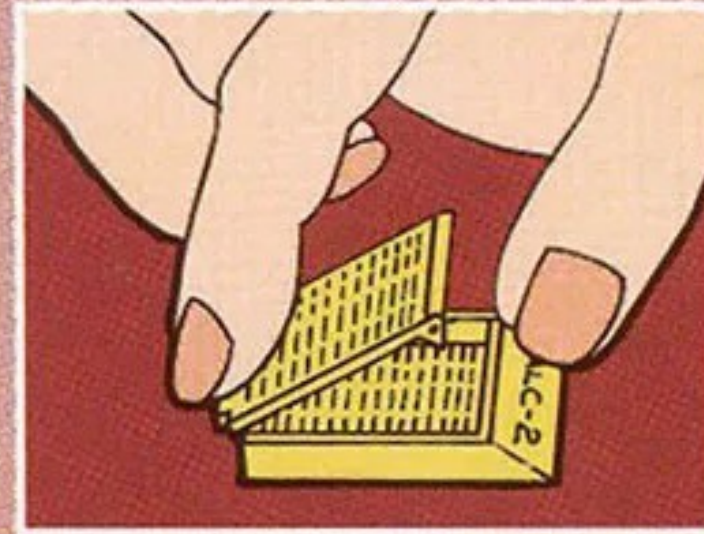
Ultra Fine Lattice For High Fluidity Paraffin Embedding



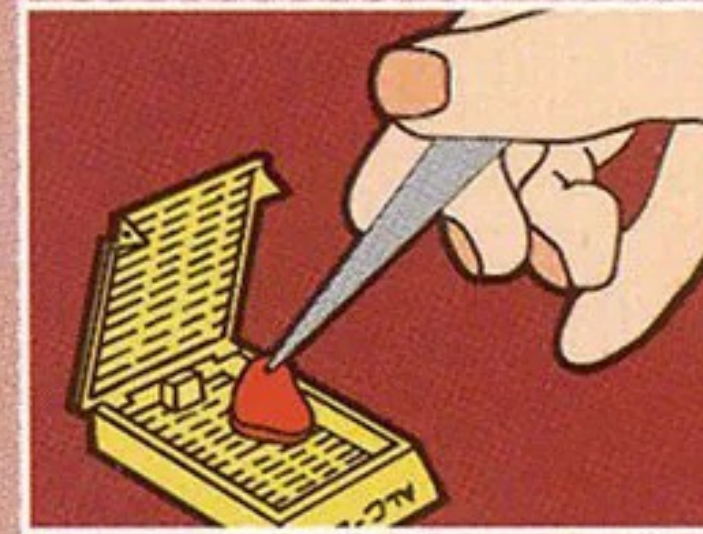
Steps to Use



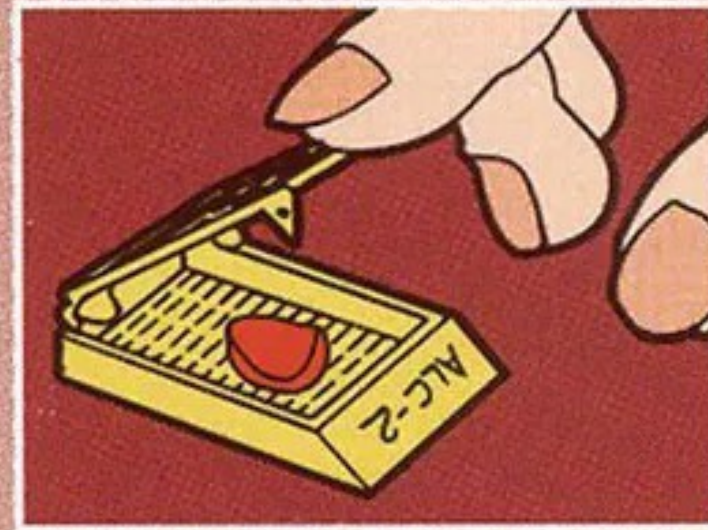
1. Label cassette on front or sides.



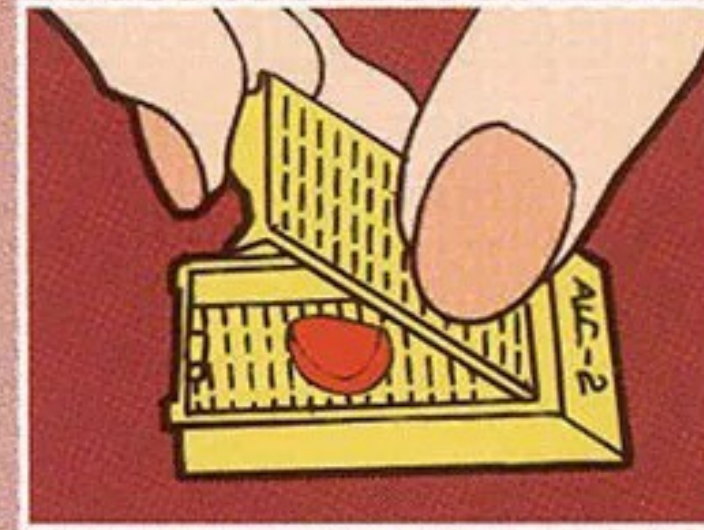
2. Press on back tab to open cover.



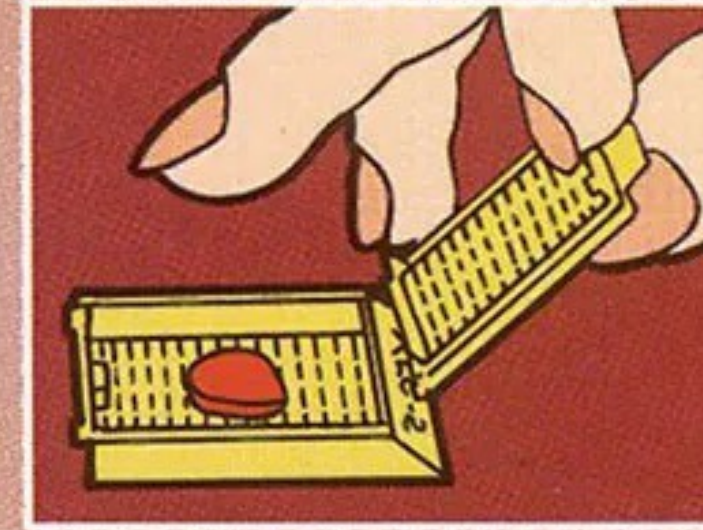
3. Insert sample.



4. Press down on lid to lock it in place.



5. To open, lift tab while pressing down on the center of lid with thumb.

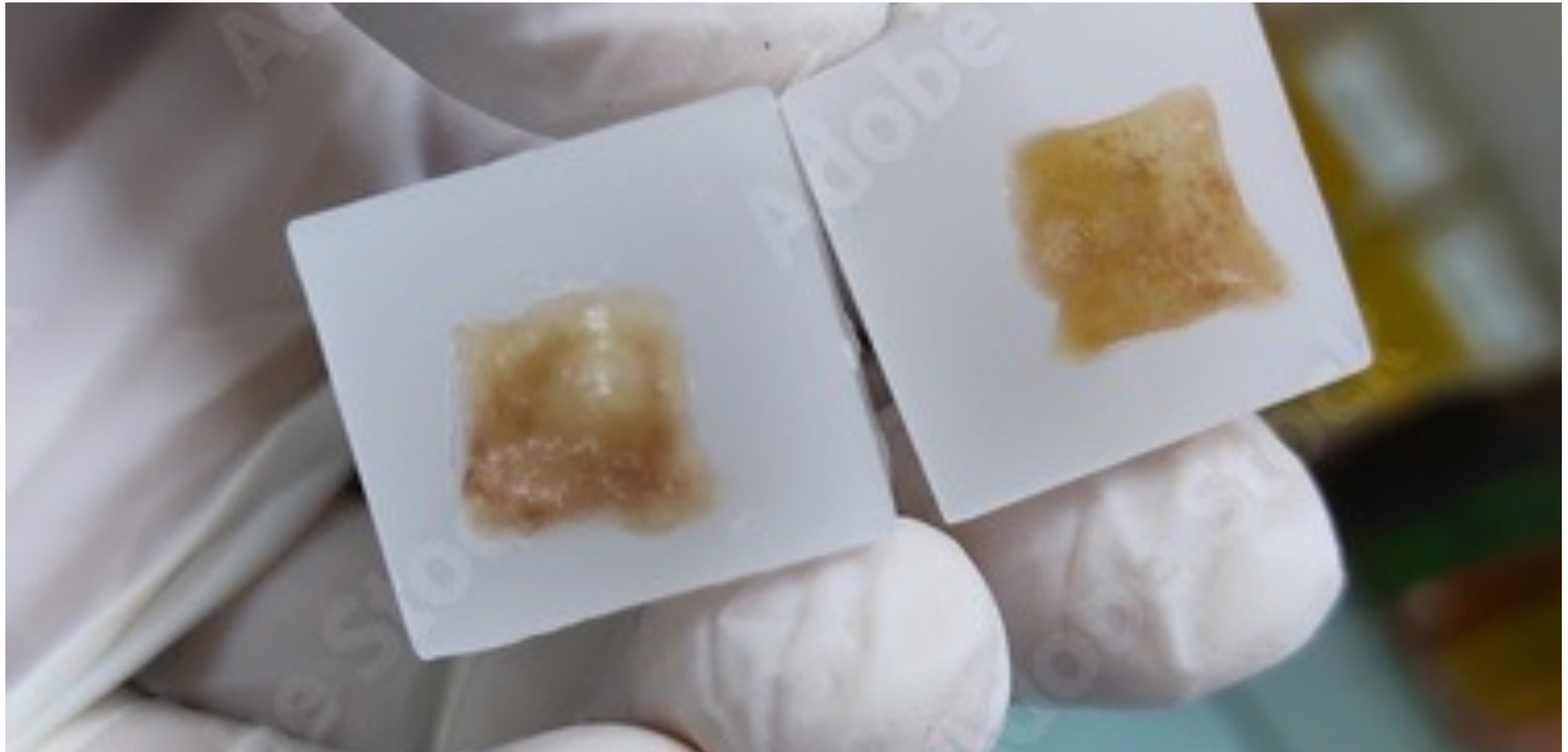


6. Remove the cover by pivoting it forward.



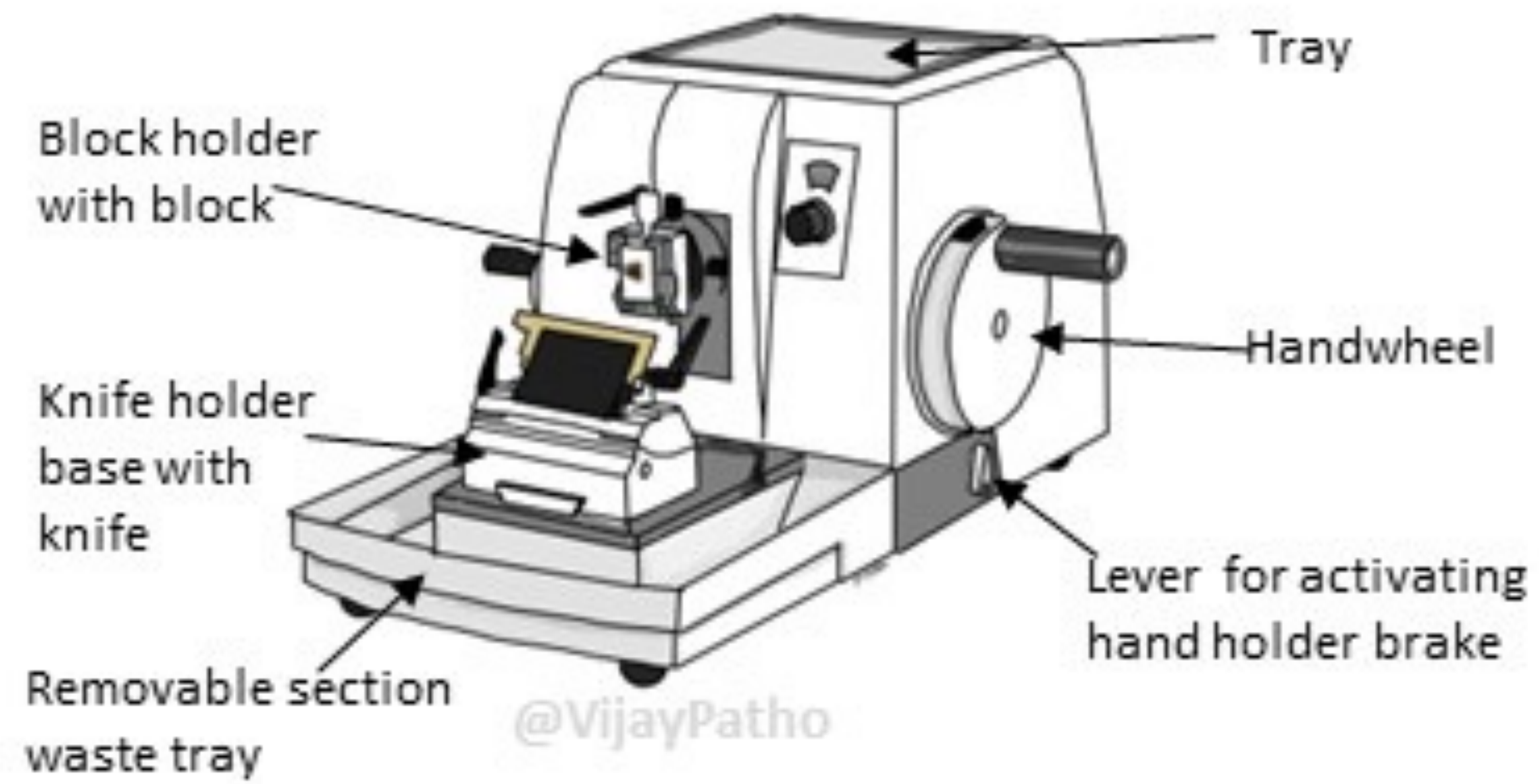
Plastic tissue cassette/ block mould

- Writing has to be done only once
- Cassettes are thin so less wax is required
- Disadvantages are a special clamp has to be used in the microtome for this technique
- The cassettes are shallow hence thin sections should be taken for processing



Paraffin block

ROTARY MICROTOME





Rotary microtome

Urinometer

- Principal – based on buoyancy
- It is used to measure the specific gravity of urine.
- Enough amount of urine is taken in the container.
- The urinometer is then allowed to float freely and then specific gravity of urine is measured by reading graduation on stem.
- Normal specific gravity 1.003 -1.030.
- Other methods of specific gravity-
 - Falling drop method using chloroform and benzene
 - Refractometer
 - Multisticks
- Correction of specific gravity has to be done in temperature(0.001/ 3 degree C), glucose(-0.004/1gm glucose/dl) and protein in urine(0.003/1gm protein/dl)

A. Urinometer



Esbach Test- Definition, Principle, Procedure, Result, Use



**Negative
Esbach Test**

**Proteins / Albumin
Absent**

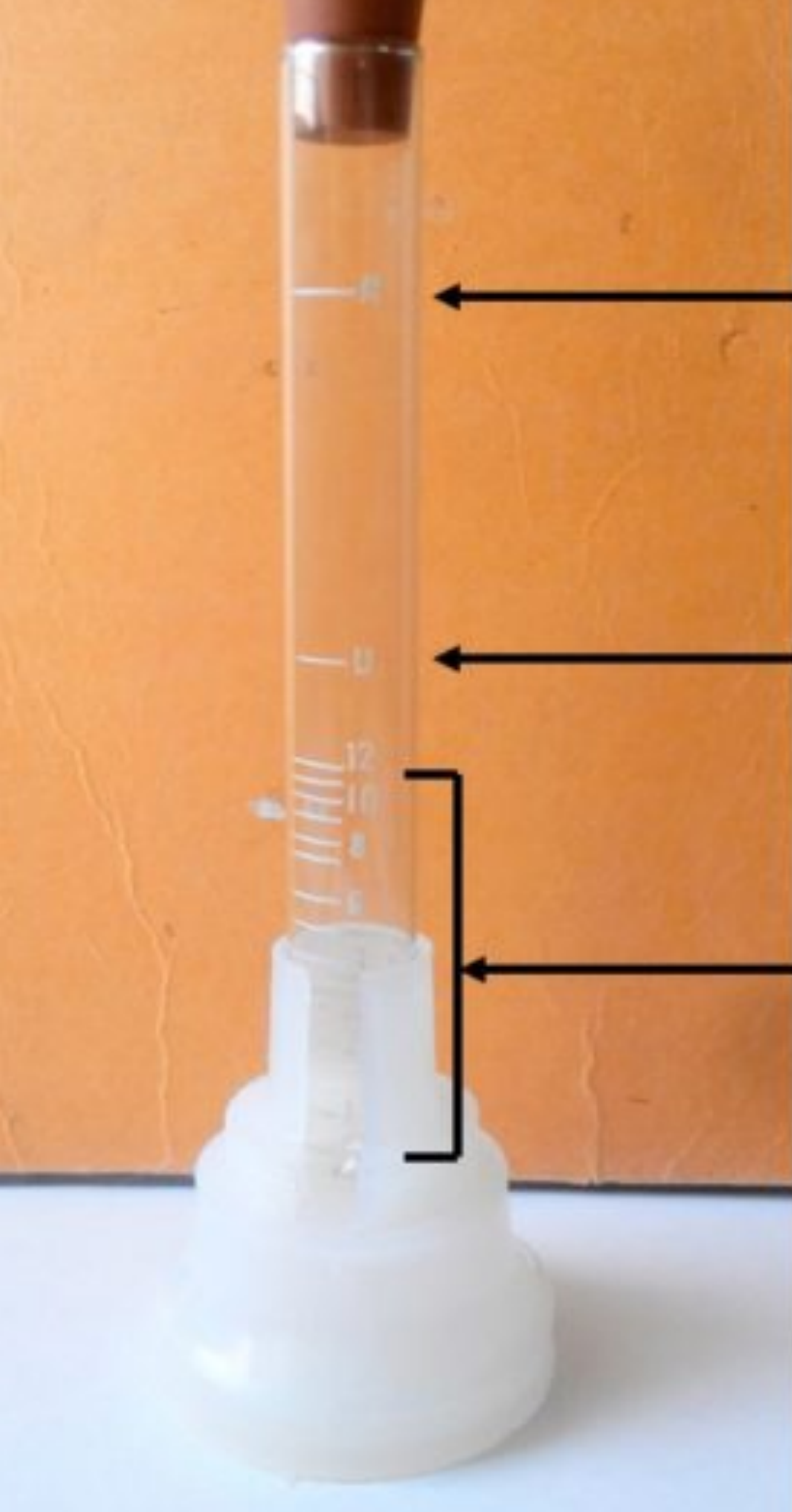
**No yellow
precipitate**



**Positive
Esbach Test**

**Proteins / Albumin
Present**

Yellow precipitate



R-Reagent

U- Urine

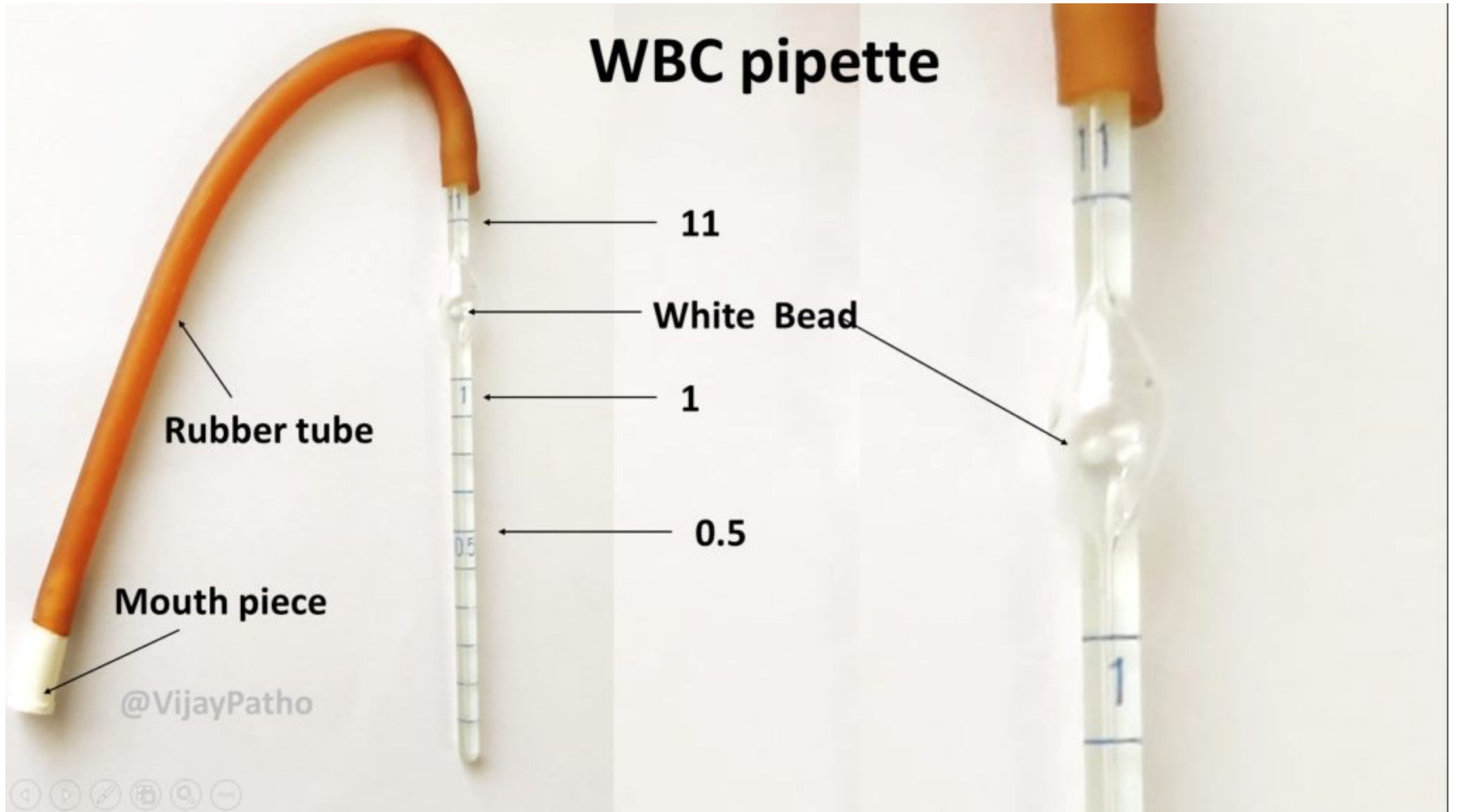
**0-12
Marking
from base
upwards**

This is a glass tube with markings. Two markings are seen U&R. U-Urine, R – Reagent.

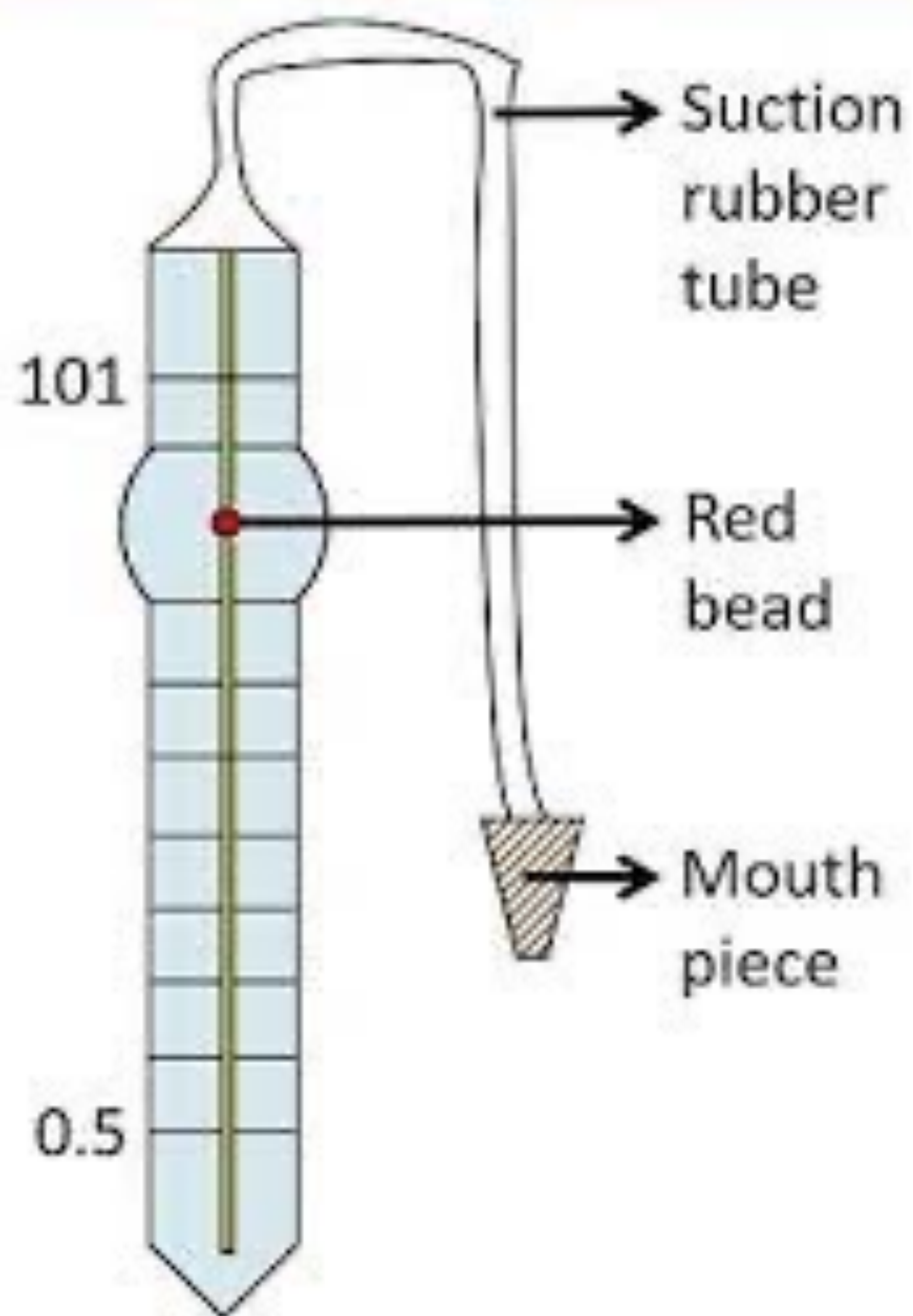
From the base up to the marking “U”, The tube is graduated from 0-12 in gm.

This is used for the quantitative estimation of albumin in the urine.

WBC pipette



RBC Pipette



S.No.	<u>RBC PIPETTE</u>	<u>WBC PIPETTE</u>
1	It has a red bead	It has a white bead
2	It has marked major calibrations of 0.5, 1.0 & 101	It has marked major calibrations of 0.5, 1.0 & 11
3	Size of bulb is larger	Size of bulb is smaller
4	Size of lumen is smaller or capillary bore lumen is narrow thus it is slow speed pipette.	Size of lumen is larger or capillary bore lumen is wider thus it is fast speed pipette
5	Mouth piece is red in color	Mouth piece is white in color
6	Dilution can be done up to 100 or 200 times	Dilution can be done up to 10 or 20 times

HEMOCYTOMETRY

What is Hemocytometry?

- It is a technique used to enumerate the total cell count in the blood or other biological body fluids.
- This can be done either by using hemocytometer manually or by electronic cells counter automatically.
- **Hemo - blood; Cyto - cell; Meter - measurement/counter**
- Thus, it is an instrument used to count the blood cells.

Purpose

- In certain pathological conditions the value of different type of cells may have the variation. Thus by counting the cells in the blood or body fluids, it can be find out if an individual is normal or not.
- Broadly, the cell count is done:
 - To find out normal and abnormal count of the cells.
 - To support and confirm clinical diagnosis of the patient.
 - To find out the response of the patient to the treatment.

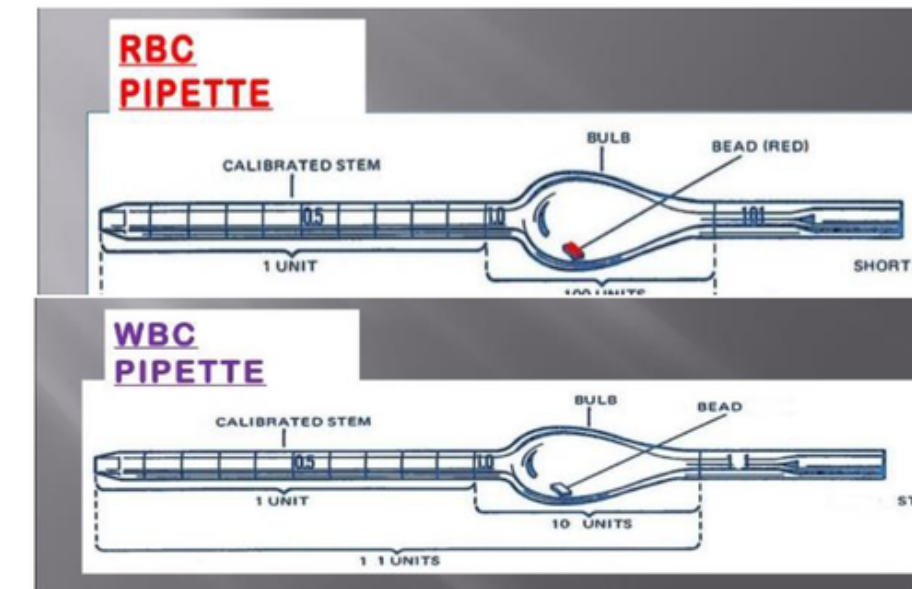
Hemocytometer

- The hemocytometer was invented by **Louis-Charles Malassez**
- It was modified by **Neubauer** and nowadays improved Neubauer counting chamber is used.
- It is a special type of microscope slide consisting of two chambers.
- This is an instrument used for counting the cells in blood or fluid.

Hemocytometer Box consist of a:

1. Special thick slide called Neubauer's counting chamber
2. Cover slips,
3. Pipette (RBC pipette and WBC pipette) for diluting the blood with rubber tube with different color plastic mouth piece for drawing blood or fluid in pipette.
4. Diluting fluids

RBC and WBC Pipettes



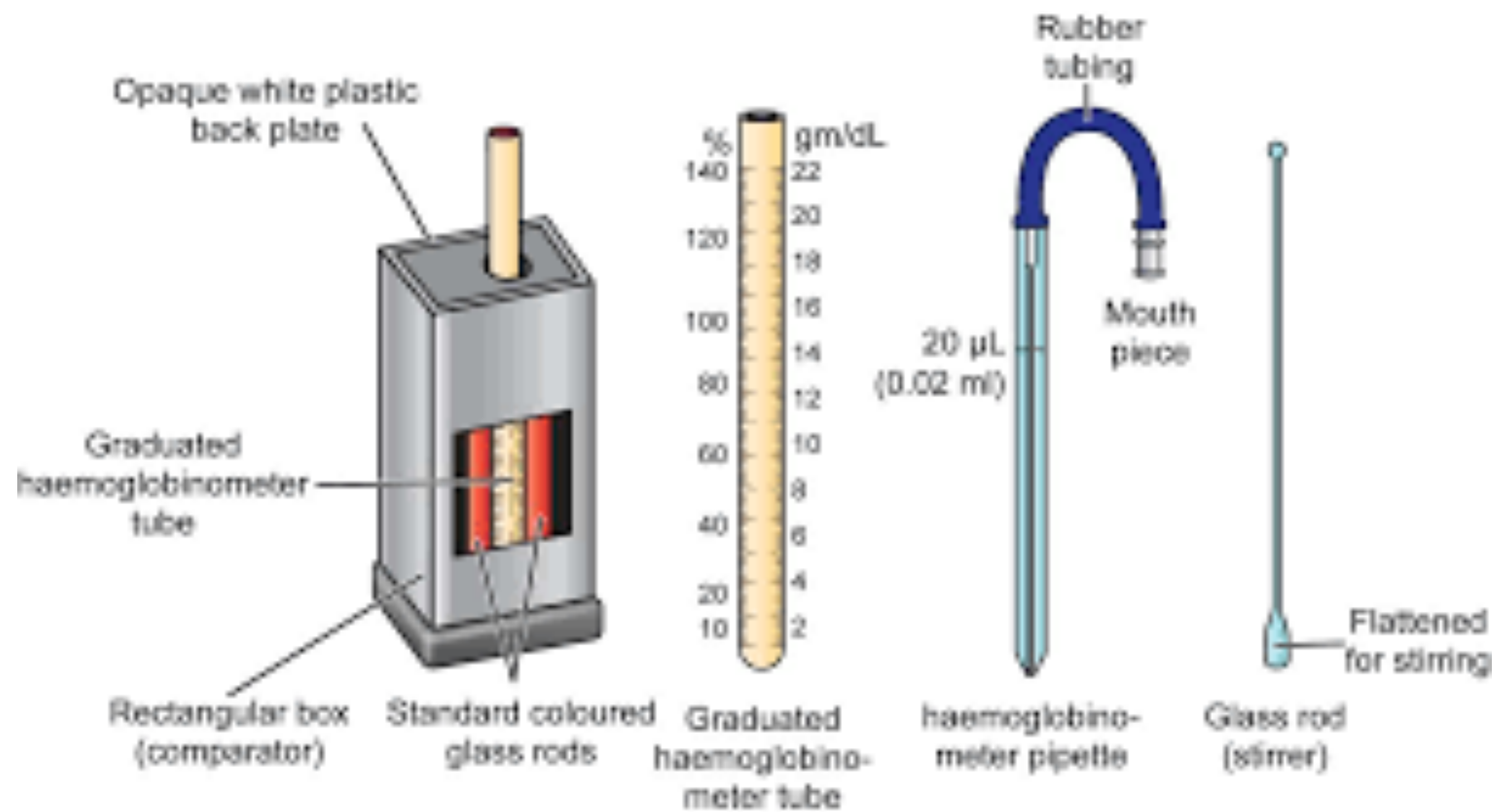
Parts of Diluting Pipettes

1. The Stem

- The long narrow stem has capillary bore and well grounded conical tip. It is divided into 10 equal parts (graduations) but has only **two marking of 0.5** in middle of stem and **1** at the junction of stem and bulb.

2. Bulb

- The stem at its upper portion widen into bulb which contains rolling bead that helps in mixing of blood with diluting fluids and helps in quick identification of pipette as the colour of bead is **red in RBC pipette** while **white in WBC pipette**.



Salah bone marrow aspiration needle

Parts

Indications

Sites of aspiration

Most preferred site other
needles used



- Indication for Bone marrow aspiration
- Anemia
- Leukaemia
- PUO
- Myelodysplastic/ Myeloproliferative disorders
- Pancytopenia
- Thrombocytopenia
- Neutropenia

Lumbar puncture needle



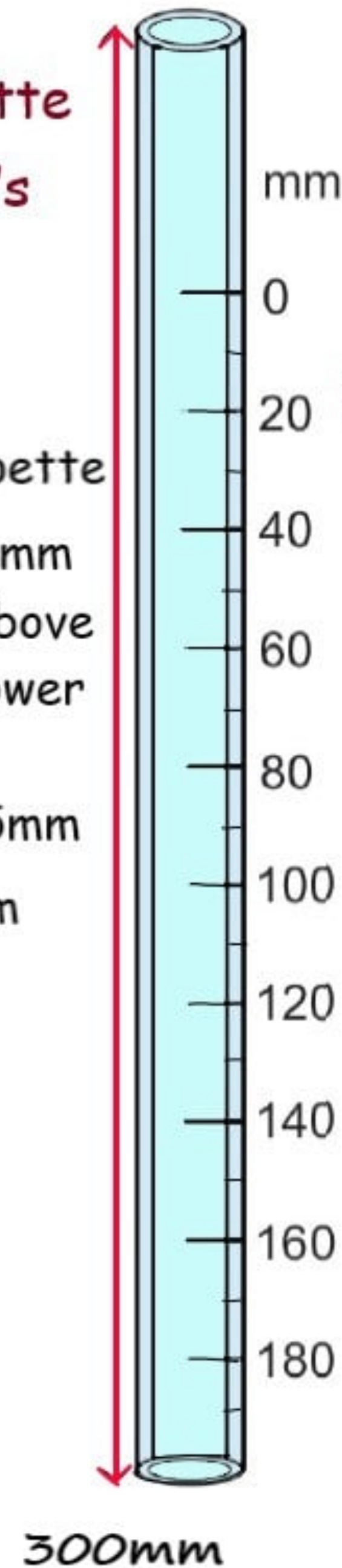
INDICATIONS

Lumbar puncture should be performed for the following indications:

- Suspicion of meningitis
- Suspicion of subarachnoid hemorrhage (SAH)
- Suspicion of central nervous system (CNS) diseases such as Guillain-Barré syndrome and carcinomatous meningitis
- Therapeutic relief of pseudotumor cerebri

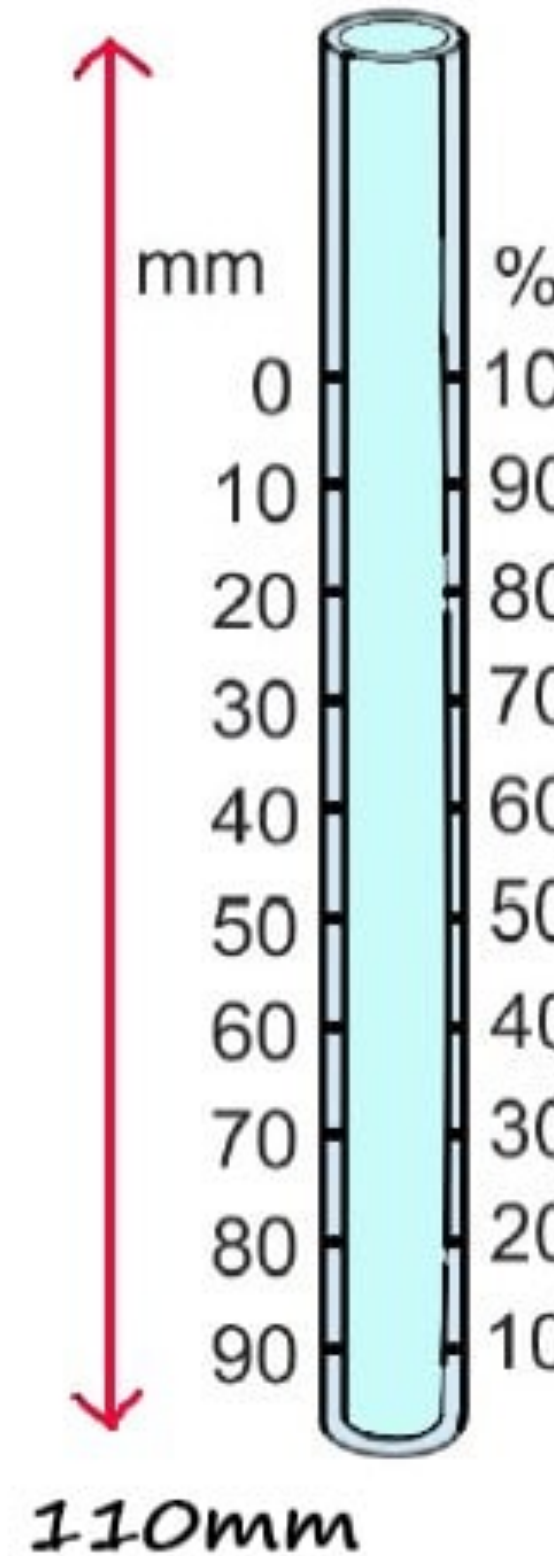
Westergren's pipette (for Westergren's method)

- 300 mm long glass pipette
- Calibrated in cm and mm from 0 to 200 from above to downwards in its lower two-third
- Bore diameter of 2.5mm
- Lower mark is 180 mm
- Known as pipette because it's both ends are open

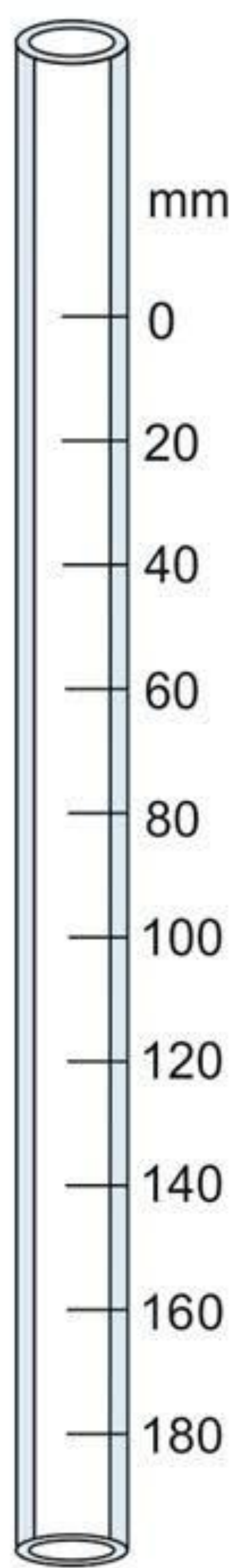


Wintrobe's tube/Haematocrit tube (for Wintrobe's method)

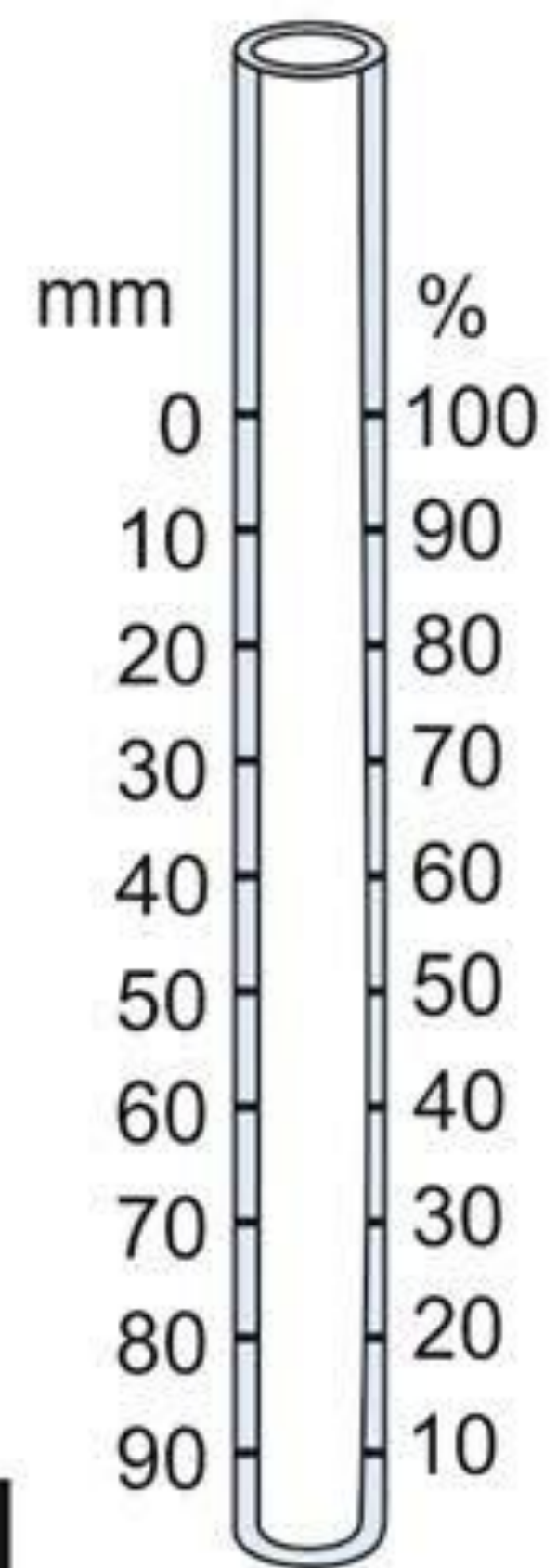
- 11 cm long, heavy, cylindrical glass tube
- Uniform bore with the diameter of 2mm
- Lower end is closed and flat
- Tube is calibrated in cm and mm from 0 to 10 cm from above downwards on one side of the scale for ESR reading
- Whereas 10 to 0 cm on other side for Packed Cell Volume (PCV) reading.



A



B



Blood bags

- Disposable biomedical transparent flexible poly vinyl chloride (PVC) containers,designed to collect, process ,store blood and blood components.
- Parts blood donor bag, a donor tube with needle and it's cover,a punturable and concealable transfusion pot and a clamp.
- SAGM bags - Saline-Adenine-Glucose-Manitol

Action of ingredients of anticoagulant solution

- Citrate- acts by chelating calcium
- Dextrose- necessary for metabolism of stored RBCs it passes from plasma into red blood cells and is utilised for energy production.
- The principle pathway being Anaerobic glycolysis.
- Citric Acid- prevents carmalization of glucose in citrate dextrose solution during autoclaving.
- Adenine- improves the viability of red cells

**Additive solution
containing combination
of
Saline, Adenine, Glucose
& Mannitol**

Glucose and adenine serve to
maintain adenosine
triphosphate(ATP) and 2,3 -DPG
While mannitol maintain
membrane integrity and
combating hemolysis.



Vacutainers

Blood collection tube

Sterile tube with coloured rubber
stopper

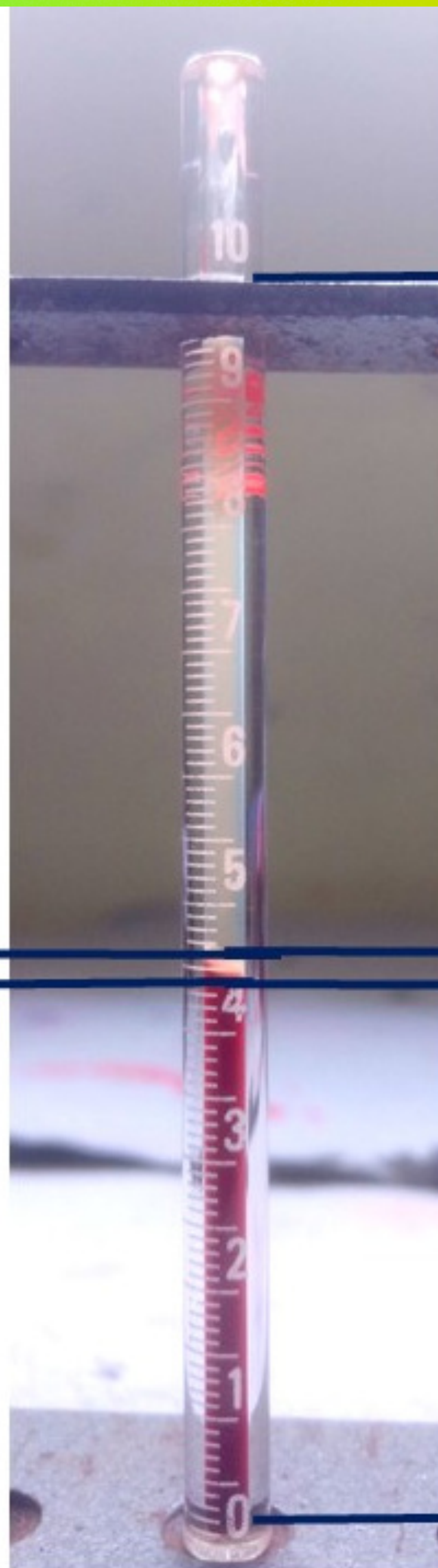
creating a vacuum seal inside of
the tube, facilitating the drawing
of a predetermined volume of
liquid.

VACUTAINER TUBES

Color	Anticoagulant	Uses
	No anticoagulant	Serological examination in biochemistry
	Sodium Fluoride	Glucose estimation
	EDTA @VijayPatho	Hematological examination like complete hemogram, ESR
	3.2% sodium citrate	Coagulation studies like PT, APTT
	Heparin	Bone marrow studies
	Citrate	Blood culture
	(K2)EDTA	Blood Bank tests. Blood typing. ABO grouping etc

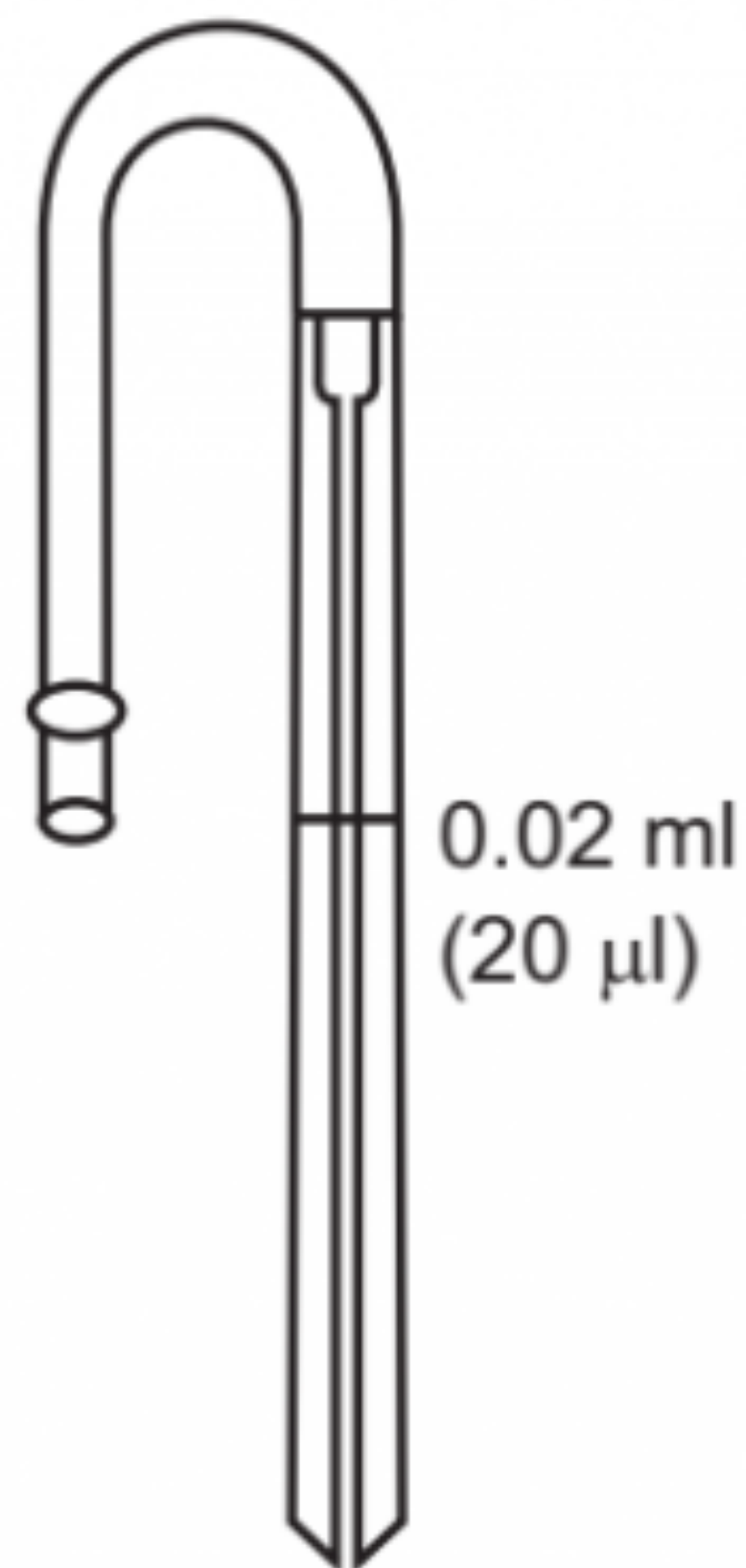
**Layers in the
wintrobe's
tube after
centrifugation**

**BUFFY
COAT
(WBC &
PLATELETS)**

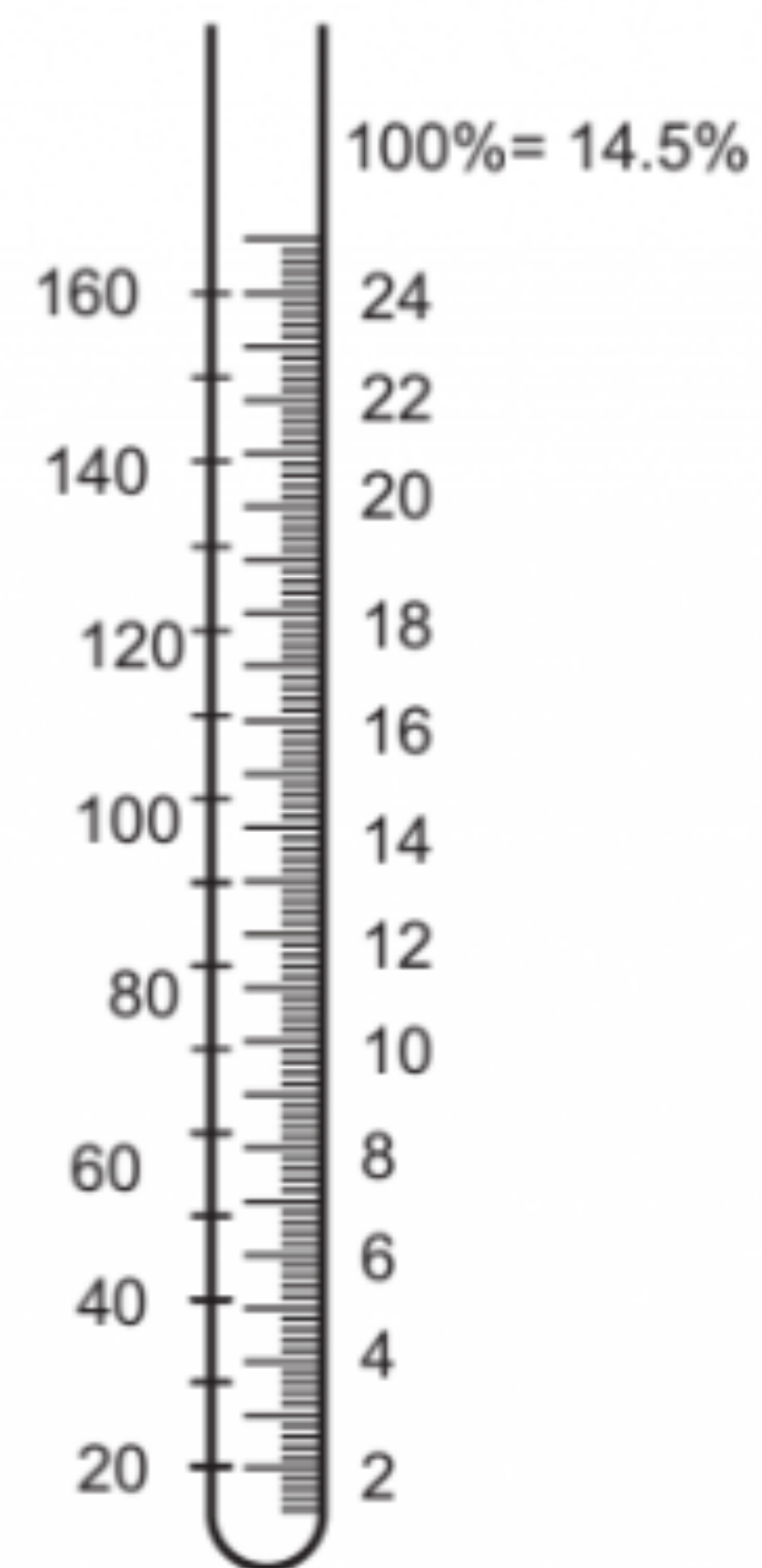


**PLASMA
LAYER**

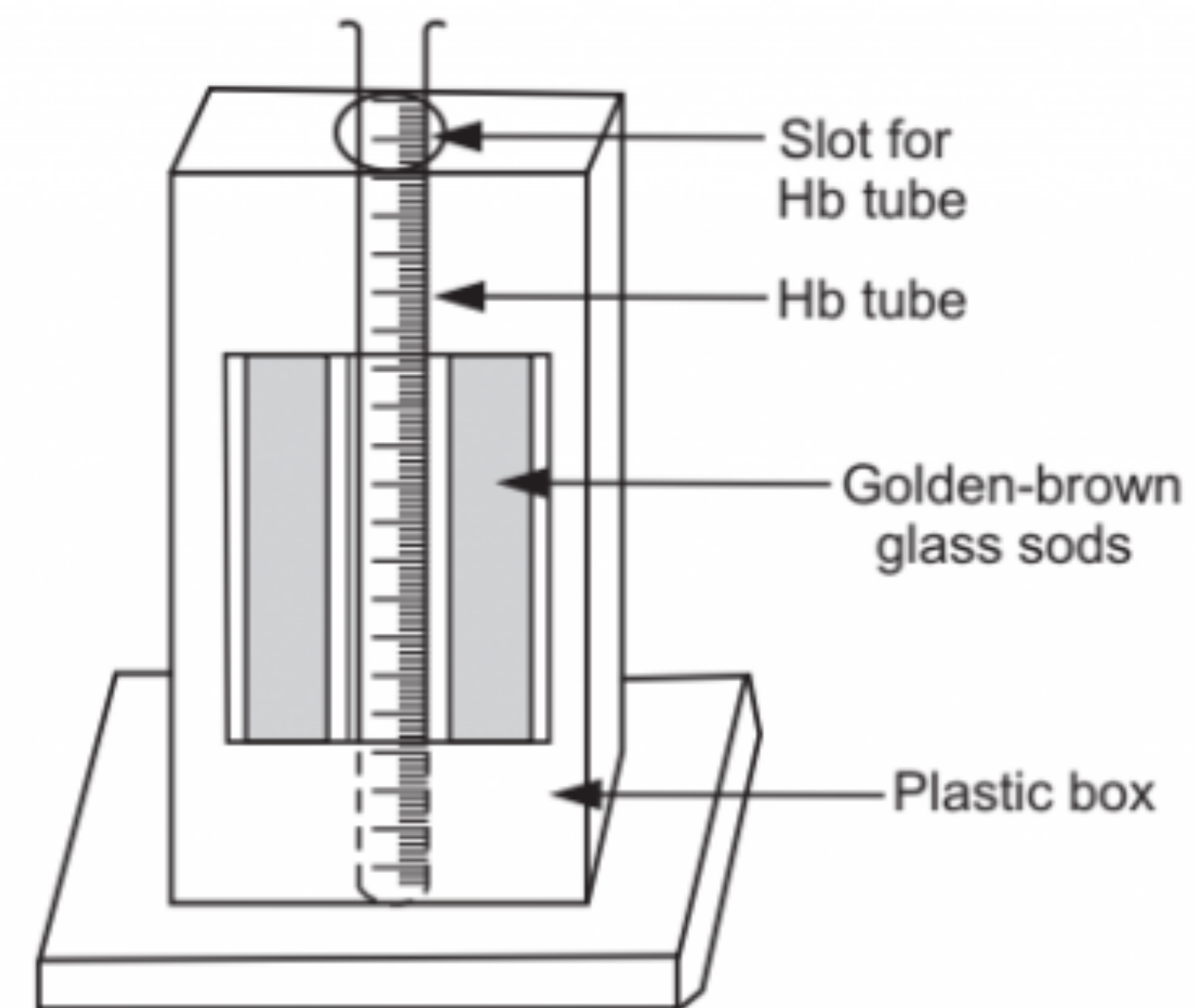
**PACKED
RBC'S
(HEMAT
OCRIT)**



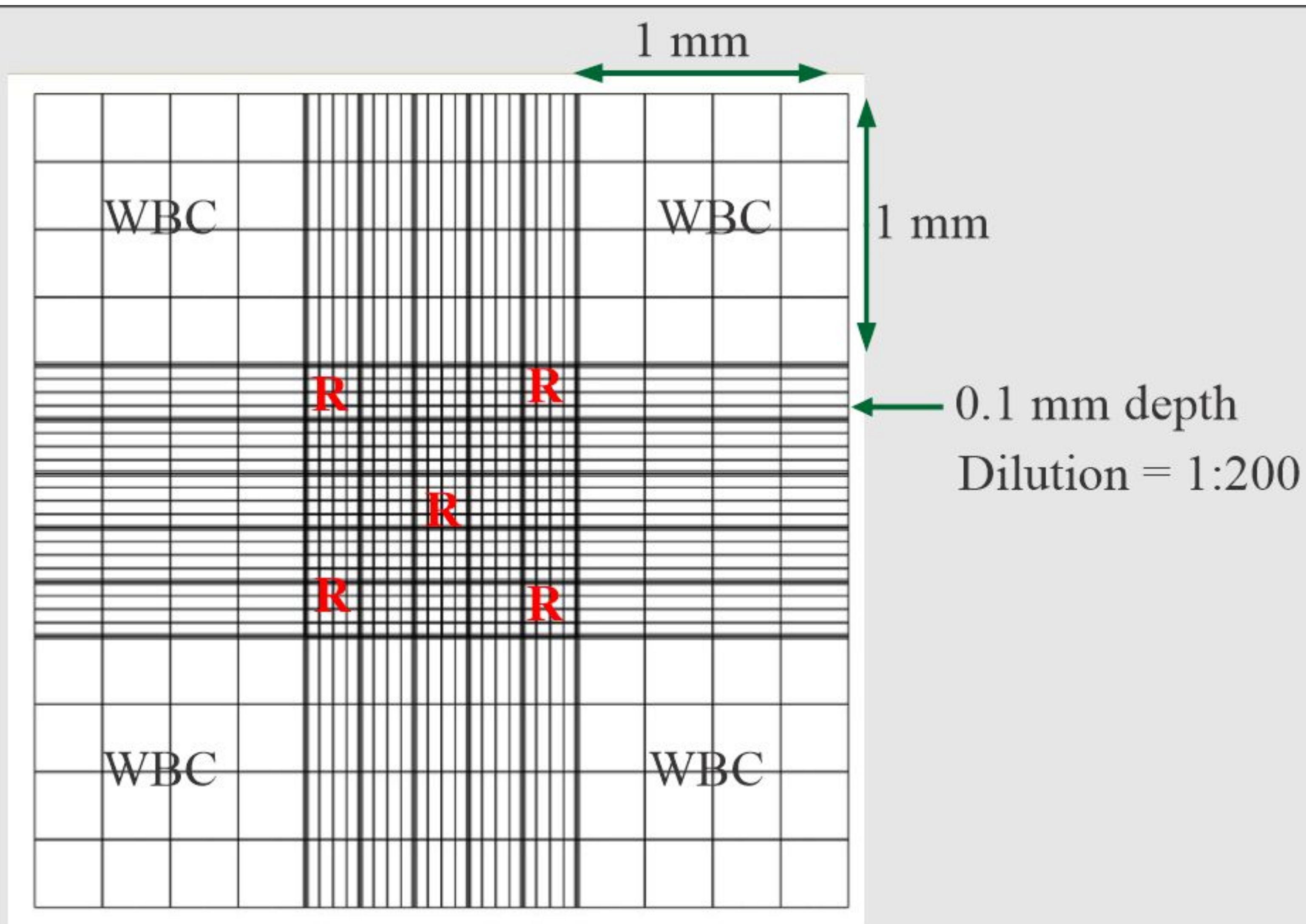
(a) Haemoglobin pipette



(b) Haemoglobin tube

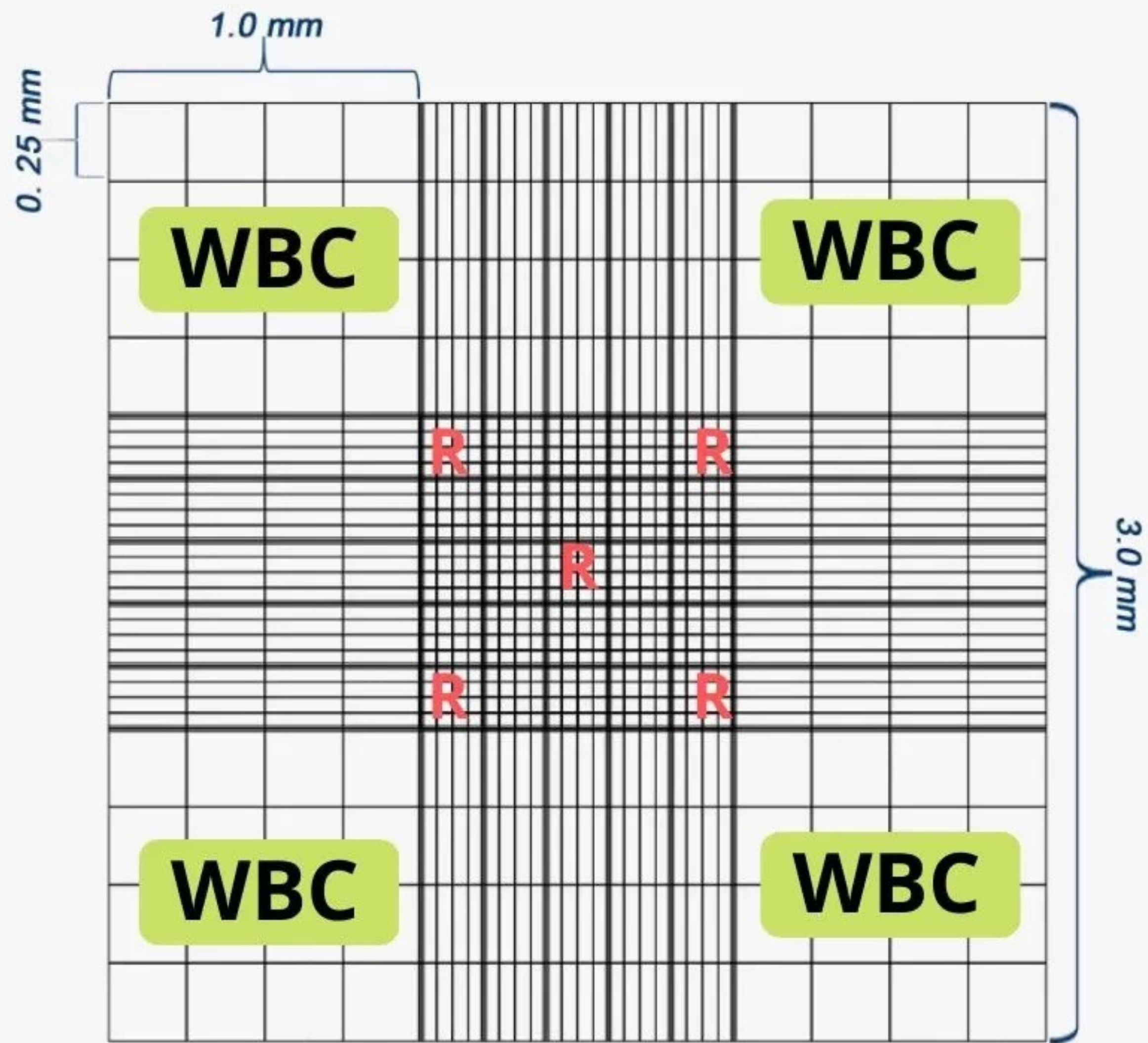


(c) Haemoglobinometer



$$\text{RBC/cmm} = \text{no. of cell counted} \times \text{dilution factor} \times \text{Depth} \times \text{Area counted}$$

$$\text{RBC/cmm} = 500 \times 200 \times 10 \times 5 = 5,000,000$$



$$\text{RBC/cmm} = \text{No. of cell counted} \times \text{Area Counted}$$



Uristix 10 parameters

10 parameters

- Glucose, bilirubin
- Ketones , specific gravity
- Blood, pH
- Protein,Urobilinogen
- Nitrite
- Leukocyte

The strip has squares on it that colour in the presence of certain substances.

The strip will then be compared to a chart on the side of the urine testing strip package.